

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions and listings of claims in the above-referenced application:

1 1. (Canceled) Apparatus for converting an optical signal to a digital
2 signal comprising:
3 a photodiode converting an optical signal to a current;
4 a transimpedance amplifier converting the photodiode current to a voltage,
5 a sawtooth generator producing a sawtooth wave, and
6 a comparator comparing the sawtooth wave with the voltage output of the
7 transimpedance amplifier, producing a pulse width modulated digital output.

1 2. (Canceled) The apparatus of Claim 1 where the sawtooth generator
2 also includes a synchronization input.

1 3. (Canceled) The apparatus of Claim 1 where the transimpedance
2 amplifier, sawtooth generator, and comparator are in a common package.

1 4. (Currently amended) An integrated circuit for converting an
2 optical signal to a digital signal comprising:
3 a photodiode converting an optical signal to a current;
4 a transimpedance amplifier converting the photodiode current to a voltage at
5 an output of the transimpedance amplifier,
6 a sawtooth generator producing a sawtooth wave, and
7 a comparator directly coupled to the output of the transimpedance amplifier,
8 the comparator comparing the sawtooth wave with the voltage output of the
9 transimpedance amplifier to produce, ~~producing~~ a pulse-width modulated digital
10 output.

1 5. (Currently amended) The ~~apparatus~~ integrated circuit of Claim ~~5~~ 4
2 further comprising ~~where the photodiode further includes~~ an optical filter.

1 6. (Currently amended) The ~~apparatus~~ integrated circuit of Claim 5 4
2 wherein a plurality of converter units, each converter unit comprising a photodiode
3 with an optical filter, transimpedance amplifier, and comparator, are synchronized to a
4 common signal.

1 7. (Canceled) The apparatus of Claim 6 where the plurality of
2 converter units are driven by a sawtooth generator internal to one of the converter
3 units.

1 8. (Canceled) The apparatus of Claim 6 where the plurality of
2 converter units are driven by a sawtooth generator external to all of the converter
3 units.

1 9. (Canceled) The apparatus of Claim 5 wherein a plurality of
2 converter units, each converter unit comprising a photodiode with an optical filter,
3 transimpedance amplifier, comparator, and sawtooth generator, are synchronized.

1 10. (Currently amended) A method of converting the intensity of an
2 optical signal source to a ~~digital~~ pulse-width modulation signal in a single integrated
3 circuit comprising:
4 filtering incident light from the optical signal source such that wavelengths of
5 visible light impinge a sensor sensitive to a select range of wavelengths, wherein the
6 select range of wavelengths is associated with one of red, green and blue light;
7 converting the ~~optical signal~~ select range of wavelengths of visible light to a
8 current;
9 converting the current ~~representing the optical signal~~ to a voltage representing
10 the optical signal;
11 generating a sawtooth wave, and
12 comparing the sawtooth wave to the voltage ~~representing the optical signal~~
13 without inverting the voltage representing the select range of wavelengths of visible
14 light and producing to produce a digital pulse-width modulated output, wherein the
15 steps of converting the current, generating and comparing are accomplished in a single

16 integrated circuit.

1 11. (Original) The method of Claim 10 where the sawtooth wave is
2 synchronized to an external signal.

1 12. (Canceled) The method of Claim 10 further including the step of
2 filtering the optical signal.

1 13. (New) An apparatus for converting light to a digital signal
2 comprising:
3 a single module comprising a ground pin, a single supply pin, and an output
4 pin, the module further comprising:
5 a photodiode configured to convert incident light to a current;
6 a transimpedance amplifier configured to convert the current to a
7 voltage;
8 a sawtooth generator configured to produce a sawtooth wave; and
9 a comparator configured to receive the sawtooth wave and the voltage
10 to produce a pulse-width modulated digital output, wherein an output of the
11 transimpedance amplifier is directly applied to an input of the comparator.

1 14. (New) The integrated circuit of Claim 13 where the module
2 further comprises a substrate.

1 15. (New) The integrated circuit of Claim 14 where the
2 transimpedance amplifier, sawtooth generator, and comparator are implemented on
3 the substrate.

1 16. (New) The integrated circuit of Claim 13 where the module
2 further comprises a synchronization pin.

1 17. (New) The integrated circuit of Claim 13 where the
2 transimpedance amplifier is directly coupled to the comparator.